

WHAT IS CLAIMED:

1. An power unit for an electronic device, comprising:
  - a fuel cell having a low output voltage between 0.3 and 1 V;
  - a conversion device coupled to said fuel cell to convert an input voltage as low as 0.3 V to a higher output voltage to operate the electronic device.
2. The power unit in accordance with claim 1, wherein said conversion device comprises a DC/DC converter.
3. The power unit in accordance with claim 2, wherein said conversion device further includes an up converter coupled to said DC/DC converter in order to boost an output voltage of said DC/DC converter to the higher voltage to operate the electronic device.
4. The power unit in accordance with claim 1, further comprising a backup battery coupled to said conversion device in order to at least supplement the output of DC/DC converter.
5. The power unit in accordance with claim 4, further comprising a battery up converter coupled to said backup battery to boost a voltage of said backup battery to a necessary level.
6. The power unit in accordance with claim 4, further comprising a heating device coupled to said backup battery and to said fuel cell that is structured and arranged to heat said fuel cell.
7. The power unit in accordance with claim 6, further comprising a temperature measuring device coupled to said fuel cell to monitor fuel cell temperature.
8. The power unit in accordance with claim 1, further comprising a dump resistor coupled to said conversion device that is structured and arranged to consume additional load from said fuel cell.
9. The power unit in accordance with claim 1, further comprising a control unit structured and arranged to control operation of said conversion device.

10. The power unit in accordance with claim 9, further comprising:  
a backup battery coupled to said conversion device in order to at least  
supplement the output of DC/DC converter; and

a battery up converter coupled to said backup battery to boost a voltage of said  
backup battery to a necessary level,

wherein said control unit is further coupled to said backup battery and to said  
battery up converter in order to control and regulate the energy supplied to the  
electronic device.

11. The power unit in accordance with claim 10, further comprising:  
a heating device coupled to said backup battery and to said fuel cell that is  
structured and arranged to heat said fuel cell; and  
a temperature measuring device coupled to said fuel cell to monitor fuel cell  
temperature,

wherein said control unit is further coupled to said heating device and to said  
temperature measuring device in order to control and regulate the temperature of said  
fuel cell.

12. The power unit in accordance with claim 9, further comprising a dump  
resistor coupled to said conversion device that is structured and arranged to consume  
additional load from said fuel cell, wherein said control unit is coupled to said dump  
in order to control and regulate operation of said converter.

13. The power unit in accordance with claim 9, said control unit  
comprising:

an A/D converter structured to receive voltage and current data from said  
conversion device;

a D/A converter structured to output reference voltage and current levels; and  
a data processor arranged to receive data from said A/D converter and to  
forward data to said D/A converter.

14. The power unit in accordance with claim 13, further comprising:

a charger interface coupled to said data processor; and  
a battery monitor coupled to said charger interface structured and arranged to collect battery data.

15. The power unit in accordance with claim 13, further comprising a host interface structured to provide two-way communication between said control unit and the electronic device.

16. The power unit in accordance with claim 1, wherein said fuel cell is an individual fuel cell.

17. A power unit for an electronic device, comprising:  
a fuel cell;  
a control unit structured and arranged to control and regulate said fuel cell; and  
a communication interface structured to provide two-way communication between said control unit and the electronic device.

18. The power unit in accordance with claim 17, wherein said fuel cell is an individual fuel cell having a low voltage of between 0.3 and 1V, said power unit further comprises a conversion device coupled to said fuel cell to convert an input voltage from said fuel cell as low as 0.3 V to a higher output voltage to operate the electronic device.

19. The power unit in accordance with claim 18 wherein said conversion device comprises a DC/DC converter.

20. The power unit in accordance with claim 19, wherein said conversion device further includes an up converter coupled to said DC/DC converter in order to boost an output voltage of said DC/DC converter to the higher voltage to operate the electronic device.

21. The power unit in accordance with claim 18, further comprising a backup battery coupled to said conversion device in order to at least supplement the output of DC/DC converter.

22. The power unit in accordance with claim 21, further comprising a

battery up converter coupled to said backup battery to boost a voltage of said backup battery to a necessary level.

23. The power unit in accordance with claim 22, wherein said control unit is coupled to said conversion device, backup battery, and battery up converter in order to control and regulate the energy supplied to the electronic device.

24. The power unit in accordance with claim 21, further comprising a heating device coupled to said backup battery and to said fuel cell that is structured and arranged to heat said fuel cell.

25. The power unit in accordance with claim 24, further comprising a temperature measuring device coupled to said fuel cell to monitor fuel cell temperature.

26. The power unit in accordance with claim 25, wherein said control unit is coupled to said heating device and to said temperature measuring device in order to control and regulate the temperature of said fuel cell.

27. The power unit in accordance with claim 18, further comprising a dump resistor coupled to said conversion device that is structured and arranged to consume additional load from said fuel cell.

28. The power unit in accordance with claim 27, wherein said control unit is coupled to said dump in order to control and regulate operation of said converter.

29. The power unit in accordance with claim 17, said control unit comprising:

an A/D converter structured to receive voltage and current data from said conversion device;

a D/A converter structured to output reference voltage and current levels; and

a data processor arranged to receive data from said A/D converter and to forward data to said D/A converter.

30. The power unit in accordance with claim 29, further comprising:

a charger interface coupled to said data processor; and

a battery monitor coupled to said charger interface structured and arranged to collect battery data.

31. The power unit in accordance with claim 29, further comprising a host interface structured to provide two-way communication between said control unit and the electronic device.

32. The power unit in accordance with claim 17, wherein said fuel cell is an individual fuel cell.

33. A process for control and regulation of an electronic device powered by a fuel cell, said process comprising:

coupling a fuel cell to an electronic device;

boosting an output voltage of the fuel cell as low as 0.3V to a level required by the electronic device.

34. The process in accordance with claim 33, wherein the boosting of the output voltage is performed by a DC/DC converter.

35. The process in accordance with claim 34, wherein the boosting of the output voltage further comprises boosting the output voltage of the DC/DC converter to the higher voltage via an up converter to operate the electronic device.

36. The process in accordance with claim 34, further comprising supplementing the output of the DC/DC converter with a backup battery, whereby the fuel cell is utilized at a maximum efficiency capacity.

37. The process in accordance with claim 36, further comprising boosting a voltage of said backup battery to a necessary level via a battery up converter.

38. The process in accordance with claim 36, further comprising heating the fuel cell via the backup battery.

39. The process in accordance with claim 38, further comprising monitoring fuel cell temperature.

40. The process in accordance with claim 33, further comprising consuming additional load from the fuel cell via a dump resistor coupled to the conversion device

that is structured and arranged to consume additional load from said fuel cell.

41. The process in accordance with claim 33, further comprising controlling the individual components of the power unit via a control unit.

42. The process in accordance with claim 41, further comprising establishing two-way communication between the control unit and the electronic device.

43. A process for control and regulation of an electronic device powered by a fuel cell, said process comprising:

coupling a fuel cell to an electronic device;

controlling operation of the fuel cell via a control unit; and

establishing two-way communication between the control unit and the electronic device.